April 5, 2021

REVIEW OF DISNEY CRUISE LINES ISLAND DEVELOPMENT EIA FOR LIGHTHOUSE POINT, ELEUTHERA, BAHAMAS

To: The Bahamas Department of Environmental Planning and Protection

Via: Phoebe Shaw & Sam Duncombe, reEarth

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Bahamian coral reefs have never been in worse condition since the first good underwater photos of coral reefs were taken in the Bahamas in 1948 by my grandfather and father.

Lighthouse Point's coral reefs have many unique features, not discussed in the EIA, that require the highest possible protection from land-based sources of pollution, such as those that would be created by proposed activities at the site.

Due to their location at the extreme southern end of Eleuthera, sticking out into clean ocean waters thousands of meters deep, these are the only coral reefs in Eleuthera that are entirely up-current from sources of land-based pollution, and therefore of the highest national conservation importance.

The EIA describes the health of the coral reefs as only "fair", based on the fact that live coral cover on hard limestone bottom was only about 1-10%, but the survey omitted the areas of highest coral cover on the east side of Lighthouse Point. Because of their exceptional water quality and lack of human disturbance, these reefs are likely among the most pristine reefs left in the Bahamas.

A really unique feature of Lighthouse Point is the fact that all three of the severely endangered Acropora elkhorn and staghorn coral species are found together in very shallow nearshore waters. These species used to be the most common in all clean shallow Caribbean coral reefs, but have almost vanished, and are very

rarely now found together anywhere. These species provide the best shoreline protection from waves and the best fish habitat because they are the fastest growing Caribbean corals. However, these corals are the most fussy about water quality, require the cleanest waters and good water circulation from waves to survive, and are the first to disappear when waters become muddy from dredging and soil erosion, or polluted with nutrients. Once these species go after water quality deteriorates, fisheries collapse and beaches wash away, a process far advanced in the developed islands of the Bahamas and Caribbean. In addition, they are especially vulnerable to coral diseases, and were the first species to be largely killed off by diseases throughout the entire Caribbean. Lighthouse Point is therefore of exceptionally high quality for the most endangered Caribbean reef building coral species, and deserves the strongest protection from any activities that would cause turbidity or nutrient inputs in coastal waters.

Three planned activities are described in the EIA that would greatly increase water quality problems at this site, namely 1) nutrient discharge to coastal waters from sewage, 2) turbidity caused by boat docking, and 3) erosion of landfill beaches onto the reef.

1) A proposed waste water treatment plant is described, but few details are given. It is not clear that sewage will be treated to tertiary level to remove the nutrients that if discharged into groundwater or surface waters will cause harmful algae blooms that will overgrow and kill corals and sea grasses. The description of the algae found on the reef make it clear that high nutrient indicating fleshy algae are absent from the reefs, and the algae present are mostly coralline algae that produce white beach sand. Nutrient inputs will cause the "bad" algae that produce no sand to overgrow and kill the "good" sand producing algae, which will put an end to new supplies of sand to make up for that which is lost in storms, while weedy algae overgrowth also prevents corals from growing upwards and protecting the beach from wave erosion. While the EIA suggests that sewage plant effluent waste water will be recycled to irrigate lawns and ornamental plants, it is practically impossible to prevent this soaking into the sea and damaging near shore reefs and sea grasses. No geotextile layer to prevent discharge into the sea is mentioned in the Lighthouse Point EIA,

and they were found not to work in a major project at Bakers Bay, Abaco, whose developers claimed that all waste water would be recycled by irrigating golf courses that were sealed off below with geotextile to prevent leakage to the aquifer and ocean. But despite these claims, I found that in fact nutrients leaked into the sea at Bakers Bay and caused harmful algae blooms and diseases that killed most of the corals on nearby coral reefs (https://www.globalcoral.org/golf-courses-kill-coral-reefs-and-fisheries-harmful-algae-blooms-and-disease-caused-by-nutrient-runoff-from-golf-course-development-on-guana-cay-abaco-bahamas/).

2) Disney Cruises are to be congratulated on their innovative design that causes no dredging for cruise ship pier installation, as dredging has caused terrible damage to reefs at cruise ship destinations all across the Caribbean. However, the strong directional jets created during ship movements while docking and leaving port stir up sediment and leave clouds of fine-grained sediment to drift over coral reefs down-current. I ran the Turks and Caicos Island Government Department of Environment and Coastal Resources national coral reef health assessment and we found that corals on reefs kilometers down-current from the cruise ship pier on Grand Turk were being killed by propeller wash suspended sediments from cruise ships docking. Before the pier went in, that reef was the last good shallow snorkeling coral reef we could find in TCI with corals in healthy condition. DECR was forced to rescue and transplant thousands of corals that were being killed by sedimentation caused by cruise ships onto artificial reefs in clear water up-current from the pier. I have seen the same effects in Cozumel and other cruise ports around the Caribbean. Some impact will be inevitable to reefs down-current from the dock to the north west of Lighthouse Point despite claims in the EIA that there will be no effect.

3) A major threat to the offshore reefs is being buried when the artificial beach provided by sand dumping on the shore is washed into the sea by storm waves. Global sea level rise and increasing storm strength caused by global warming make this inevitable. These beaches are naturally narrow because of their strong exposure to waves due to the narrow shelf, hard flat limestone bottom, and the fact that most of the coral is in deep water at the

edge of the drop off. There is a large amount of sand produced by coralline algae, but most of it is washed away into deep water, and the area is generally starved of sand, with only a very thin veneer of mobile sand over hard limestone rock. Sand placed above the high tide mark will be unstable in the long run. It will partly be washed onto the sand dunes by storm waves and wind, but eventually most will be washed into the sea and over the edge of the drop off into deep water. Corals between the shore and the reef edge will be buried by this sand fill as it migrates across the narrow shelf. This is the process by which beach renourishment by dumping sand on the beaches killed all of the inshore coral reefs that used to line the coast of Southeast Florida. If the goal is to keep the emplaced sand on the beach for cruise ship passengers, they will need to grow coral reefs to protect them from erosion, or make artificial ones.

I would like to congratulate the authors of this EIA for the exceptionally complete job they made describing the site and the species found there, despite incomplete studies due to Covid. Their thorough descriptions allowed the offshore ecological conditions of the site to be determined, even though it was missing from the analysis in the EIA itself. For example, although the EIA says that no reef fish spawning aggregation sites exist in the area that could be impacted, and that the nearest one reported is around 30 miles away, this is probably because no detailed studies have been made there. Lighthouse Point is almost certainly a major breeding aggregation site for groupers and other fish, because what they look for is a submarine headland pointing out into deep water, and indeed Lighthouse Point is likely to be the prime spawning site in Eleuthera. It is also clear that the previous proposal to develop the site would have been much more damaging to the reef!

In conclusion this proposed development, although far less damaging than its predecessor, risks damage to unique Bahamian coral reefs and fisheries of national conservation importance through leakage of sewage causing harmful algae blooms, turbidity caused by cruise ships, and erosion of beach sand fill unprotected from storm waves.

Please note that I have received no money for days of my time to review and comment on the 551 page EIA. My comments are purely

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motivated by what is best for Bahamian coral reefs and fisheries resources and not by any considerations of personal financial benefit, such as that accruing to the highly paid teams that produced this EIA.

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